

*Ice in Rivers and Opening of Navigation.*—The most interesting feature under this head relates to the ice blockade in Lake Huron, which lasted from the 8th to the 15th, at St. Clair Flats, after having been open during the previous two weeks. At Fort Brady, Mich., ice was running in river from 7th to 14th. Navigation opened as follows: Erie canal, on the 8th. Marquette, 6th; heavy floating ice from the 1st to the 6th. The first vessel arrived at Oswego, N. Y., from Lake Michigan on the 11th.

## TEMPERATURE OF WATER.

The temperature of the water in rivers and harbors is shown by the table on chart No. II. The highest temperatures are: 79° Savannah; 82° Augusta; 90° Key West. Lowest temperatures: 33° Eastport and Marquette; 36° Escanaba; 38° Duluth; 40° Alpena; 41° Detroit and La Crosse.

*Largest Ranges.*—27° La Crosse; 24° Grand Haven; 23° Cleveland and Keokuk; 22° Buffalo; 21° Pittsburgh; 20° Duluth and St. Paul.

*Smallest Ranges.*—3° San Francisco; 4° Eastport; 7° Chicago; 8° St. Paul; 9° Marquette; Portland, Me.

## ATMOSPHERIC ELECTRICITY.

*Thunder-storms or diffuse lightning* are reported: 1st, Mass., Tenn.; 2nd, Col., Dak., Kan., Mo., Tex., Vt.; 3rd, Ind. Ty., La., Miss., Tex., Tenn.; 4th, Dak., Ill., Iowa, Ind. Ty., La., Miss., S. C., Tex.; 5th, Fla., Ga., Kan., Ky., Miss., N. C.; 6th, Fla., Ga., La., Miss., S. C., Tenn., Tex.; 7th, Ala., Fla., Ill., Miss., New Mex., Tex. (lightning); 8th, Ind., N. C., Neb.; 9th, Dak., Md., Neb., Tex.; 10th, Col., Dak., Ill., Kan., Mo., Neb., Tex.; 11th, Ala., Fla., Ind. Ty., Kan., Tex.; 12th, Ala., Ga., Ill., Kan., La., Miss., Mo., Tenn., Tex.; 13th, Col., Ga., Ill., Ind. Ty., Miss., Tenn., Tex., Utah; 14th, Col., Dak., Fla., Ill., Ind., Ind. Ty., Kan., Miss., Mo., Neb., N. C., S. C., Tenn., Tex., Wis.; 15th, Cal., Dak., Fla., Ill., Ind., Iowa, Mich., Minn., Mo., Neb., N. Y., N. C., Ohio, Penn., Tenn., Tex., Wis.; 16th, Conn., Dak., Ill., Iowa, Kan., Mass., Md., Me., Mich., Minn., Mo., Neb., N. J., N. Y., Penn., Tenn., W. Va.; 17th, Conn., Dak., Ill., Iowa, Mass., Me., Neb., N. J., N. Y., Penn., Wis.; 18th, Conn., Fla., Iowa, Kan., Me., Neb., N. Y., R. I., Tex., Vt.; 19th, Dak., Fla., Ga., Kan., Minn., Mo., Neb., Tex., Va.; 20th, D. C., Dak., Ill., Ind., Iowa, Kan., Ky., Md., Mich., Miss., Minn., Mo., N. C., N. J., Ohio, Penn., Tex., Va., W. Va., Wis.; 21st, Ala., Conn., D. C., Dak., Del., Ga., Ind., Kan., Md., Mich., N. C., N. J., N. Y., Ohio, Penn., S. C., Tenn., Tex., Va., W. Va.; 22nd, Conn., Del., Ga., Kan., Mass., Md., Mo., Neb., N. C., N. H., N. J., N. Y., Ohio, Penn., Tenn., Tex., Vt., Va., W. Va.; 23rd, Col., Dak., Fla., Kan., Me., Mo., N. C., Neb., Tex.; 24th, Col., Kan., Me., N. Y., Tex., Vt., Wyo.; 25th, Col., N. J., Tex., Vt., Wyo.; 26th, Fla., Neb., N. J., Penn., Tex.; 27th, Mo., Neb., N. J., Tex.; 28th, Conn., Dak., Minn., Miss., Neb., Tex.; 29th, Dak., Ill., Minn., Neb., Tex.; 30th, Col., Conn., Dak., Ill., Ind. Ty., Iowa, Kan., Mass., Mich., Minn., Neb., N. J., N. Y., Wis.; 31st, Dak., Ill., Iowa, Kan., Minn., Mo., Neb., Wis.

*Telegraphic ground currents* were reported at Santa Fe on the 23rd and 24th. Strong currents also prevailed in the Middle and Eastern States during the aurora of the 28th. At Pike's Peak on the 12th and 24th.

*Auroras.*—The auroras of the month of May have been more numerous and brilliant, and more extensively observed than for some years past. They have been reported from three hundred and thirty stations, on seventeen dates, distributed as follows, (the numbers following the name of each State express the number of reports received.) 1st, Iowa, 1. 2nd, N. J., 10; Mich., 7; Dak., 3; Mass., 10; N. Y., 7; Penn., 7; Va., 3; W. Va., 1; Conn., 3; R. I., 1; D. C., 1; Neb., 1; Ill., 1; Iowa, 2; Md., 3; Minn., 1; N. H., 2; Ohio, 2; Vt., 1; Wis., 4. 3rd, Mass., 2; Minn., 2; Mich., 3; Nev., 1; Mich., 1; Del., 1; Iowa, 1; N. H., 1; N. J., 1; Ohio, 1; Wis., 3. 4th, N. Y., 1; Mich., 1; Mass., 1. 7th, Kan., 1. 9th, Wis., 1. 10th, Me., 2; Mich., 1; N. J., 1. 11th, Mich., 2; Me., 3; N. H., 2; N. Y., 1. 12th, N. H., 1; N. Y., 1. 13th, Me., 1; Mass., 1. 16th, N. Y., 1. 18th, N. Y., 1. 21st, N. Y., 1. 28th, N. J., 12; N. Y., 25; Mich., 9; Mass., 14; Vt., 5; Ohio, 14; Ill., 8; Va., 6; Iowa, 40, of which 28 are due to the kind co-operation of Prof. J. Hinrichs; Penn., 8; Me., 7; Ind., 7; Tenn., 2; N. C., 2; Ky., 1; Wis., 2; W. Va., 1; N. H., 2; Conn., 2; R. I., 2; Mo., 1; D. C., 1; Dak., 1; Del., 1; Kan., 1; Md., 5; Minn., 1. 29th, Ohio, 2; N. Y., 4; Va., 1; Wis., 1. 30th, Me., 4; N. Y., 1; Wis., 1. 31st, Minn., 2.

The large number of reports relative to the brilliant aurora of the 28th, render this especially interesting. The following preliminary account is all that need at present be given. It was visible from Maine on the east to Kansas and Dakota on the west, and as far south as North Carolina and Kentucky. At Washington three arches were seen in the northern heavens, the altitude of the upper one being about 23°, with streamers to 45°. At Vevay, Ind., the arches rose to altitude 45° and streamers to zenith; the magnetic compass needles were in constant agitation, oscillating through an arc of 3°. Throughout eastern Iowa the heavens appeared illumined by streamers from the north passing to the zenith. At Cambridge and Waltham, Mass., arches reached to the zenith, and fragments formed to the south. At Grand Haven, Mich., the

streamers and light extended from east and west through the zenith. At Detroit, Mich., three arches were seen at altitudes of 45°, 65° and 90°; also a corona near the zenith, and streamers and light 10° south of zenith; the three arches were continually moving upward or southward and back again, reaching sometimes 15° south of zenith. At Adrian, Mich., two arches first appeared, then a third one at or south of zenith from E. to W.; similar phenomena was seen throughout Mich. In Connecticut streamers flashed near to the zenith. In Illinois and Indiana observers generally report no true arch, but only waves, clouds, and streamers of light. At Gardiner, Me., a beam from east to west reached the zenith. New Jersey two arches seen, the second indefinite and within the first. Central New York arches from east to west through the zenith, and two or three others lower down towards the north; a fine corona was observed at Cazenovia, North Volney, Oneida and North Argyle; at New York city the altitudes of the arches were 45°, with streamers to the zenith. In Ohio telegraph lines were affected with ground currents, and one, and sometimes two perfect arches were observed, with streamers reaching to 75° altitude. Vermont, one of the most brilliant ever seen; corona was seen at Newport. Wisconsin, corona was seen at Manitowoc, Neillsville, and Rocky Run. The electric disturbance on telegraph wires was sufficient to interrupt the ordinary business between New York, Buffalo, Baltimore, Montreal and Washington.

### OPTICAL PHENOMENA.

*Solar Halos.*—1st, Ind., N. J., N. Y.; 2nd, Ill., Ind., Iowa, Minn., Ohio, Wis.; 3rd, Del., Md., N. J., N. M., Ohio, Penn., Va., Vt.; 4th, Ga., Iowa, Me., Neb., N. H., Ohio, S. C.; 5th, Ind., Iowa, Mass., N. J., N. Y., Ohio, R. I., Wis.; 6th, Cal., Conn., Me., Mass., N. H., N. Y.; 7th, Minn., N. J., N. M., Wy.; 8th, Conn., Iowa, Mass., Mich., Neb., N. H., Ohio, R. I.; 9th, N. Y.; 10th, Ala., Fla., Ill., Kan., Ky., Miss., N. Y.; 11th, Iowa, N. Y., Wis.; 12th, Conn., Ind., Iowa, Mass., N. Y., Ohio, R. I., Wis.; 13th, Ind., Me., N. J., Ohio, Wy.; 14th, Ala., Ind., Ky.; 15th, Ala., Dak., Ind., Iowa, La., N. Y., Ohio; 16th, Fla., Ind., Iowa, N. Y., Tenn., Wis.; 17th, Ga., Ill., Ind., Mass., N. J., N. Y., Ohio; 18th, Conn., Ill., Ind., Miss., N. Y., Ohio, S. C., Wis.; 19th, Conn., Fla., Ga., Ill., Ind., Mich., N. H., N. Y., Ohio, Wis.; 20th, Conn., Ill., N. J., R. I.; 21st, Me., N. H.; 22nd, Ill.; 23rd, Texas; 24th, Ala.; 25th, Neb.; 26th, N. H.; 28th, Conn., Ill., Me., Mich., Wis.; 29th, Neb.; 30th, Ill.; 31st, Conn., Mass., N. Y., R. I.

*Lunar Halos.*—2nd, Iowa, Mo.; 5th, N. Y.; 14th, Ind.; 15th, Iowa, Mich., N. J., Penn.; 16th, Ind., Ky., N. J., Ohio; 17th, Conn., Ga., Ill., Ind., Iowa, Me., Mass., N. J., N. C., Texas, Wis.; 18th, Ala., Ill., Ind., Iowa, La., Mich., Mo., N. J., N. Y., Tenn., Wis.; 19th, Del., Ind., Me., Mich., Minn., N. J., N. Y., Ohio, Penn., Texas, Utah, Va.; 20th, Miss., Mo., N. J., N. Y., Va.; 21st, Cal., Mich., Mo., Texas; 22nd, Kan., Mo., Neb., Texas, Va.; 23rd, Iowa, Mo., Texas; 24th, Ala., Mo.; 25th, Minn.; 27th, Ga., Iowa; 28th, Fla.; 29th and 30th, La.

*Mirage.*—Tybee Island, Ga., 1st, 8th; Duluth, Minn., 8th, 23rd, 24th; New Bedford, Mass., 25th; Barnegat, N. J., 31st.

*Scintillation of Stars.*—No observations of scintillation have been received for May.

### MISCELLANEOUS PHENOMENA.

*Zoological.—Botanical.*—The blooming and ripening of fruits only have been reported: *Apple* in bloom on the 5th in Conn.; 19th, Ga.; 7th and 13th, Ill.; 7th, 13th and 17th, Iowa; 19th and 31st, Me.; 16th, 17th and 21st, Mass.; 13th, Mo.; 2nd, Neb.; 4th, N. J.; 15th, N. H.; 21st and 30th, N. Y.; 6th, 7th, 8th, 13th, 14th and 15th, Ohio; 14th and 22nd, Penn.; 19th, Vt.; 18th, Wis. *Asparagus* ripe, 1st, Mass. *Cherry* in bloom, 1st, 7th, 11th, 12th and 13th, Mass.; 4th, Conn.; 14th, 15th and 18th, N. Y.; 1st, Ohio; 8th, Penn.; 16th, Vt.; ripe, 22nd, Miss. *Currants* in bloom, 6th, Mass. *Peach* in bloom, 6th, Conn.; 3rd and 13th, Mass.; 19th, N. Y.; 2nd, 11th and 15th, Ohio; ripe, 30th, Texas. *Pear* in bloom, 4th, Ill.; 16th, Me.; 10th, 13th, 14th and 17th, Mass.; 17th, N. H.; 18th, 19th and 21st, N. Y.; 9th and 18th, Penn. *Plum* in bloom, 18th, Ill.; 11th and 13th, Iowa; 3rd and 13th, Mass.; 19th, N. Y.; 18th, Penn.; 15th and 18th, Vt.; 12th, Wis. Ripe, 22nd, Miss. *Quince* in bloom, 26th, Mass.; 9th, N. J.; 18th, Ohio; 19th, Penn. *Blackberries* in bloom, 20th, N. J. Ripe, 10th, Texas. *Almond* in bloom, 2nd, Neb. *Strawberries* in bloom, 1st, N. J.

*BIRDS.*—The first arrival and their migrations are reported as follows: *Blackbirds*, 3d, Kans. *Blue-jays*, 5th, Kans. *Bobolinks*, 18th, Iowa; 15th, Me.; 13th and 15th, Mass.; 14th, N. Y. *Cuckoos*, 19th, N. J. *Ducks*, 30th, Dak.; 19th, Mass., NW., and 22d, NE. *Geese*, 3d, 4th, 5th and 6th, Neb., N.; 15th, Minn., N. *Kingbirds*, 7th, Neb.; 12th, Ohio. *Martins*, 2d, Wis. *Night Hawks*, 16th, Iowa. *Orioles*, 1st, Me.; 10th and 14th, Mass.; 12th, Neb.; 12th and 15th, N. Y.; 12th, Ohio; 14th, Vt.; 17th, N. J. *Robbins*, with young, 15th, N. Y. *Swallows*, 7th, Me.; 6th, Mass.; 9th, Neb.; 1st, 14th and 16th, N. Y.; 3d, Ohio; 8th, Utah; 6th and 7th, Vt.; 14th, Virg. *Yellowbirds*, 8th and 10th, Mass.; 17th, N. Y. *Whippoorwills*, 19th, Iowa; 14th, Mass.; 1st, Ohio.

*INSECTS.*—*Grasshoppers*, flying at Camp Sheridan, Neb., N., 28th, NE., 29th; 2nd, still hatching out at